

4 Assessment of Functional Cross Section Options

4.1 General

As described in Section 2.2 above, the functional cross section provided is a D2M, dual two lane carriageway (urban motorway standard) with widened hard shoulders to allow for peak hour operation of the hard shoulder as a bus lane.

The two configurations considered are illustrated in Drawing FRC/C/076/D2M/021 in Appendix D.

- Two Corridor Layout
- Single Corridor Layout

4.2 Alternative Functional Cross Section Arrangements

As well as the D2M arrangement, the bridge geometry allows the cross section to be arranged in a variety of different ways allowing a flexible approach to be taken to the lifetime usage of the bridge:

- **D2M + Footways:** With the hard shoulder reduced to 2.75 m (minimum urban motorway standard), footways could be accommodated on the bridge. This could be a potential temporary usage of the bridge to maintain a non-motorised user link across the Firth of Forth if the existing bridge were temporarily completely closed for rehabilitation. The temporary footways could be located on one or both edges of the deck. The connection of the footways at either end of the bridge is an issue which would have to be resolved.
- **D2 + Tram / LRT:** Tram / LRT corridors could potentially be accommodated on the bridge in the future if the carriageway is reduced to dual two all purpose (i.e. without hardshoulders). It is assumed that the tracks would be located on the near side to minimise disruption to the road during installation. A further variation on this arrangement would be to have a single track of tram / LRT along one edge and retain the hard shoulder on the opposite carriageway.

These potential arrangements are illustrated in Drawing FRC/C/076/D2M/022 in Appendix D.

4.3 Assessment of options

In terms of functionality for the intended D2M usage there is little to distinguish between the two different configurations. The provision is essentially identical apart from the separation between the carriageways. The greater separation of the Two Corridor Option is anticipated to be slightly advantageous since the approach roads have widened central reserves to achieve the necessary sight lines and therefore the tie in is slightly easier. Nevertheless, both options are reasonable.

The Single Corridor option has the ability to provide traffic crossovers (contra-flows) between the carriageways on the bridge which is an advantage but this is not considered a particularly important criterion since the length of the structure is not excessive (crossovers could be arranged beyond the end of the bridge) and wide hard shoulders are proposed which could allow resurfacing without the need for crossovers to allow contra flows.

When alternative arrangements are considered, the Single Corridor option may be advantageous since the position of the central barrier which subdivides the carriageways could potentially be moved. This could perhaps allow two tracks of LRT to be installed along one edge of the bridge rather than one track either side. Moving the central barrier does have some issues in terms of structural modifications and crossfalls / drainage so the advantages are limited.

The differences are summarised below:

Issue	Two Corridor Layout	Single Corridor Layout
Functionality for intended usage	Identical	
Traffic crossovers	Cannot be provided	Could be provided
Tie in with approaches	Widened central reserve ties in well with approaches	Narrow central reserve
Operational flexibility	Carriageway subdivision is fixed	Some increased operational flexibility for alternative arrangements

On balance the functional cross sections appear to be scheme neutral with minor advantages and disadvantages to each.